CHAPTER 4

4 ENVIRONMENTAL CONSEQUENCES

4.1 Groundwater

4.1.1 Alternative 1 - Cumberland-Montgomery Study Area

Because of the extensive limestone aquifer in the project area, Alternative 1 could result in adverse impacts to groundwater if appropriate protective measures are not implemented.

Contaminated and turbid water are problems that can plague the users of water from wells and springs in limestone aquifers. Sinkholes are sometimes used to dispose of solid and liquid wastes. Water that recharges limestone aquifers through waste-filled sinkholes can transport contaminants into the aquifer, and the contaminated water can spread rapidly through a system of interconnected solution openings until it reaches wells or springs. Solution features, such as swallow holes, in streambeds allow sediment-laden storm runoff to enter the aquifers directly. Contamination and turbidity problems can become worse during periods of prolonged, intense rainfall.

As noted above in Chapter 2, appropriate best management practices described in Muncy (1999) would be implemented during the construction and operation of the proposed transmission line. With the implementation of these measures, the impacts to groundwater would be insignificant.

4.1.2 Alternative 2 - Cumberland-Davidson Study Area

The proposed Cumberland-Davidson Study Area is underlain by the same Mississippian limestone aquifers as the Cumberland-Montgomery Study Area. As noted above in Chapter 2, appropriate best management practices described in Muncy (1999) would be implemented during the construction and operation of the proposed transmission line. With the implementation of these measures, the impacts to groundwater would be insignificant.

4.1.3 Alternative C No Action

Under the no action alternative, there would be no additional impact to current groundwater conditions.

4.2 Surface Water

4.2.1 Alternative 1 - Cumberland-Montgomery Study Area

This study area contains six streams that are included on the state 303(d) list as not meeting or partially meeting their designated uses (Table 3-1). Five of these listings include siltation as one of the causes for the listing. There are no waters within this study area that are classified as “high quality” by the state.

Soil disturbances associated with access roads or other construction activities can potentially result in adverse water quality impacts. Erosion and sedimentation can clog small streams and threaten aquatic life. Removal of the tree canopy along stream

crossings can result in increased water temperatures and adverse impacts to aquatic biota. Improper use of herbicides to control vegetation could result in runoff to streams and subsequent aquatic impacts.

Precautions would be included in the project design, construction, and maintenance to minimize potential impacts and to avoid the addition of sediment or siltation to the 303(d) listed streams. Permanent stream crossings would be made so as not to impede runoff patterns and the natural movement of aquatic fauna. Temporary stream crossings and other construction and maintenance activities would comply with appropriate state permit requirements and TVA requirements as described in Appendices B and C, as well as in Muncy (1999). These measures include installation of silt screens and sediment traps, restrictions on use of heavy equipment near streams, and prompt revegetation. Canopies in all streamside management zones would be left undisturbed unless there were no practicable alternative. The situation where streamside canopies are left undisturbed, however, is rare and restricted to streams in deep ravines. Right-of-way maintenance that requires chemical treatment would employ only EPA-registered herbicides used in accordance with label directions.

4.2.2 Alternative 2 - Cumberland-Davidson Study Area

This study area contains four streams that are included on the state 303(d) list as not meeting or partially meeting their designated uses (Table 3-2). Three of these listings include siltation as one of the causes for the listing. There are two streams within this study area that are classified as “high quality” by the state (the Harpeth River and the South Fork Harpeth River).

Potential surface water impacts and the environmental measures that would be employed to mitigate potential effects would be essentially the same as discussed in Section 4.3.1.

4.2.3 Alternative 3 No Action

Under the no action alternative, there would be no additional impact to current surface water conditions.

4.3 Vegetation

4.3.1 Alternative 1 - Cumberland-Montgomery Study Area

Some changes to the existing plant communities of the area would occur under Alternative 1. The greatest anticipated impact to these resources would be associated with the permanent conversion of forested habitat to non-forest conditions associated with the ROW corridor. The magnitude of this impact would in turn depend upon the degree of forest fragmentation that results, the extent to which any of the forest communities affected were considered uncommon or otherwise sensitive from a state or regional perspective, and the extent to which the resulting loss in forest contributes to regional trends in forest cover.

One plant community of conservation concern (Kentucky-Tennessee Big Barrens) has been previously reported from the counties crossed by the Cumberland-Montgomery Study Area (Table 3-3). This community primarily consists of herbaceous vegetation that would be expected to be minimally affected by the construction of the transmission line. Three additional communities of concern have been reported from the surrounding vicinity, and

could occur in the Cumberland-Montgomery Study Area. Among these, only the Western Highland Rim Escarpment Post Oak Barrens contains woody vegetation that could be adversely impacted by the construction of the transmission line. Once line routes are identified, field surveys will be carried out to determine the presence of uncommon or otherwise sensitive vegetation. The results of these surveys, as well as the potential impacts to vegetation, will be included in the Final EIS. Until then, the impacts of this alternative action on vegetation are only partially known.

Based on the forest area and forest tract size characteristics of the four Cumberland-Montgomery Study Area corridors, the likely impact of constructing the transmission line in Corridors A and B would be very similar and greater than in either Corridor C or D. The impacts would be lowest for a transmission line in Corridor D, which has the lowest proportion of forest area, the lowest forest acreage, and the highest degree of forest fragmentation (i.e., lowest average forest tract size).

Invasive Terrestrial Plants

Under Alternative 1, changes to the existing native plant communities of the area could facilitate the spread of invasive terrestrial plants already present in the project area. This would be especially true where the proposed corridor travels through intact forests or woodlands. Once final transmission line routes are known, TVA will inspect them to determine the prevalence and risk from invasive plants. This analysis will be described in the Final EIS. As described in Section 2.2.1, no invasive species would be planted when areas disturbed during construction are revegetated or during subsequent maintenance activities. TVA will also take measures to minimize transporting invasive plants between different sections of the ROW.

4.3.2 Alternative 2 - Cumberland-Davidson Study Area

Changes to the existing plant communities of the area would occur under Alternative 2. The greatest anticipated impact to these resources would be associated with the permanent conversion of forested habitat to non-forest conditions associated with the ROW corridor. The magnitude of this impact would in turn depend upon the degree of forest fragmentation generated and the extent to which any of the forest communities affected were considered uncommon or otherwise sensitive from a state or regional perspective.

Four plant communities of conservation concern have been reported from the counties crossed by the Cumberland-Davidson Study Area (Table 3-3). Three of these primarily consist of herbaceous vegetation that would be expected to be minimally affected by the construction of the transmission line. A fourth community, the Western Highland Rim Escarpment Post Oak Barrens, contains woody vegetation that could be adversely impacted by the construction of the transmission line. Field surveys to determine the presence of uncommon or otherwise sensitive vegetation in the project area will be conducted once potential transmission line routes are defined. Until then, the impacts of this alternative action on vegetation are only partially known.

Based on the forest area and forest tract size characteristics of the two Cumberland-Davidson Study Area corridors, the likely impact of constructing and operating the transmission line in Corridor B would be slightly greater than in Corridor A. The forest-related impacts resulting from selection of either of these corridors would be greater than

those associated with any of the Cumberland-Montgomery Study Area corridors, and could be significant.

Invasive Terrestrial Plants

Under Alternative 2, changes to the existing native plant communities of the area could facilitate the spread of invasive terrestrial plants already present in the project area. This would be especially true where the proposed corridor travels through intact forests or woodlands, and, because they are more heavily forested, the risk of spreading invasive plants is somewhat greater in the Alternative 2 corridors than in the Alternative 1 corridors. Once final transmission line routes are known, TVA will inspect them to determine the prevalence and risk from invasive plants. This analysis will be described in the Final EIS. As described in Section 2.2.1, no invasive species would be planted when areas disturbed during construction are revegetated or during subsequent maintenance activities. TVA will also take measures to minimize transporting invasive plants between different sections of the ROW.

4.3.3 Alternative 3 No Action

Under the No Action Alternative, the proposed transmission line would not be built. With respect to vegetation, no project-related impacts to vegetation would occur.

4.4 Wildlife

4.4.1 General Effects to Wildlife and Their Habitats

Construction of the proposed transmission line would result in a change in the structure and function of wildlife habitat along the length of the corridor. Most woody vegetation would be removed from within the right-of-way, which would then be maintained in an early successional state. The initial clearing would likely temporarily displace large animals, such as deer and turkey, from the site. Many smaller animals, such as shrews, moles, frogs and salamanders would be destroyed by construction activities. Following the construction and revegetation of the site, wildlife favoring edge and early successional habitats would exist in the area.

Environmental effects resulting from the proposed action are expected to include the loss of forested habitat and increased fragmentation of remaining adjacent forests. Overall, an increase in early successional habitats types, as well as an increase in the amount of edge habitats, would occur along the length of the right-of-way. The increase in early successional and edge habitats would benefit species such as the fence lizard, black racer, white-eyed vireo, northern cardinal, indigo bunting, field sparrow, and eastern cottontail rabbit. It would also likely result in increased predation and nest parasitism by the brown-headed cowbird in the remaining forest fragments. These effects, as well as the outright loss of forest habitats, would negatively affect wildlife species dependent on forest-interior habitats such as the cerulean warbler and ovenbird.

4.4.2 Alternative 1 - Cumberland-Montgomery Study Area

Potential environmental affects resulting from the selection of this alternative could include disturbance to at least one plant community type of conservation concern. The majority of this study area is forested upland; however, it contains a higher proportion of early successional habitat than the Cumberland-Davidson Study Area. This study area also

contains more herbaceous and woody wetlands than the Cumberland-Davidson Study Area. Due to the higher proportion of early successional communities in this study area, selection of this alternative would potentially affect less forested area than the Cumberland-Davidson Alternative. Unlike with forested communities where clearing is often unavoidable in order to route a new transmission line, grasslands, barrens and herbaceous wetlands may undergo limited disturbance during construction activities. Overall, selection of this alternative would have less effect on forest-dwelling birds, including neotropical migrants, as well as forest-dwelling mammals, reptiles, and amphibians, than would the selection of the Cumberland-Davidson Alternative. The selection of the Cumberland-Montgomery Alternative would also have less impact on forest habitat and wildlife communities in general.

Corridors A, B and C have similar proportions of forests and similar acreage of large (>1000 acres) contiguously forested tracts. Corridor C is somewhat shorter than Corridors A or B, has a lower total number of forest patches, and lower total forested area. Of the four Cumberland-Montgomery corridors, Corridor D has the lowest proportion and acreage of forested uplands, the highest proportion of non-forested habitats, and is the most fragmented. The potential for impacts to forest-associated wildlife populations would be greatest in Corridors A and B, somewhat lower in Corridor C, and the lowest in Corridor D.

The wetland complex located north of the Cumberland City Ferry and Cumberland Fossil Plant could be negatively affected by the construction of the transmission line within Corridor D. Several areas that focus on wildlife management could also be affected by the selection of Corridor D. The degree to which these resources would be impacted depends on the final alignment of the transmission line.

4.4.3 Alternative 2 - Cumberland Davidson Study Area

Potential environmental affects resulting from the selection of this alternative could include disturbance to at least six different plant community types of conservation concern. Almost three-fourths of the study area is forested upland, and most of the remaining area is herbaceous planted/cultivated vegetation. Overall, this study area contains a higher proportion upland forested habitat than the Cumberland-Montgomery Study Area. This study area contains less herbaceous and woody wetlands than the Cumberland-Montgomery Alternative. Due to the predominance of forested habitat in this study area, selection of this alternative would likely affect more forested area than the Cumberland-Montgomery Alternative. Unlike in grassland or other open habitat types, clearing is unavoidable when routing a new transmission line through forested habitat, and the less fragmented nature and larger tract size of forests in the Cumberland-Davidson Study Area make it more difficult to avoid forested tracts during transmission line routing studies. Overall, selection of this alternative would have greater effects on forest-dwelling birds, including a larger number of neotropical migrants, as well as forest-dwelling mammals, reptiles, and amphibians, than would the selection of the Cumberland-Davidson Alternative. The selection of this alternative would have more impact on forest habitat and wildlife communities in general.

Corridor A would pass through the Cheatham Wildlife Management Area. Corridor B contains a slightly larger number of large, contiguously forested tracts than Corridor A. Overall, there is little variation in the habitat types between Corridors A and B. Similarly, there is little variation in forest patch statistics. Therefore, selection of either of the alternatives in this study area is expected to have similar impacts on wildlife.

4.4.4 Alternative 3 No Action

Under the No Action Alternative, the proposed transmission line would not be constructed. Therefore, no wildlife or their habitats would be affected.

4.5 Endangered and Threatened Species

The following subsections summarize the occurrence of endangered and threatened species in the study areas based on available information. Once transmission line routes are identified, field studies will be carried out to determine the presence of listed species and potential impacts to them. Consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act will be conducted following the completion of the field studies. The impact analyses and results of the consultation will be described in the Final EIS.

4.5.1 Alternative 1 - Cumberland-Montgomery Study Area

Plants – As stated in Section 3.5.1, two Federally listed and 23 state-listed plant species have been reported from within this alternative study area. Several populations of Lesquereux's mustard, a candidate for Federal listing, are known from the area common to Corridors A and B. This species often occurs in early successional habitats such as cultivated fields, and would not necessarily be adversely affected by the construction of a transmission line in its immediate vicinity. A population of the Federally listed Price's potato-bean is known from Corridor D; this species grows in woodland openings and forest edges. All four corridors also contain populations of several state-listed plant species. These state-listed plants occupy a variety of habitats including woodlands, wetlands, barrens and bluffs. Based on currently available information, the likelihood of impacting listed plants is lower in Corridor C than in the other corridors.

Terrestrial Animals – Corridors A, B and D contain populations of the Indiana bat, Federally listed as endangered. The gray bat, Federally listed as endangered, is also known from Corridor D. Three state-listed terrestrial animal species are known from Corridors A and B, and four state-listed terrestrial animal species are known from Corridors C and D. Some of these species, such as Bewick's wren occur in brushy areas or woodland edges, and would likely not be adversely affected by transmission line construction. Other species occupying forests could be adversely affected.

Aquatic Animals – The potential impacts to endangered and threatened aquatic species would likely be similar for a transmission line in Corridors A, B, or C. These corridors all cross the Cumberland River and streams in the Red River system. Blue sucker, ashy darter, Tippecanoe darter, slenderhead darter, and southern cavefish are present in one or more of the streams or cave systems within these corridors. The blue sucker and the southern cavefish both occur within Corridor D. Of the four Alternative 1 corridors, selection of Corridor D would have the lowest potential to adversely affect endangered and threatened aquatic animals. The impacts to these species resulting from the selection of any of the four corridors would likely be insignificant. To the extent feasible, the transmission line would be designed to minimize stream crossings and avoid caves and karst areas. Total avoidance of these areas, however, is unlikely, as other constraints, including costs, must also be considered. As described in Chapter 2, stringent erosion and sedimentation control measures, including streambank revegetation, would be implemented during construction and subsequent maintenance activities to minimize impacts to aquatic resources.

4.5.2 Alternative 2- Cumberland Davidson Study Area

Plants – Several populations of the Federally listed Eggert's sunflower are known from Corridors A and B. This species occupies barrens and roadsides, and would not necessarily be adversely affected by the construction of a transmission line in its immediate vicinity. Corridor A also contains at least two state-listed plants occupying alluvial woods, seeps, and limestone creek beds. Corridor B contains at least two state-listed plants found in glades and cultivated fields.

Terrestrial Animals – Four species of state-listed terrestrial animals are known from Corridor A and one state-listed terrestrial animal is known from Corridor B (Table 3-9). The cerulean warbler, which occupies mature forests, is known from both corridors and could be adversely affected by transmission line construction. The other three species known from Corridor A also occupy woodlands, although they are apparently not as sensitive to fragmentation as the cerulean warbler. Based on currently available information, the potential for adverse impacts to listed terrestrial animals is somewhat lower in Corridor B than in Corridor A.

Aquatic Animals – Construction and operation of the proposed transmission line in either Corridors A or B would affect the Cumberland River as well as several stream crossings within the Harpeth River system. In addition to the blue suckers reported from the Cumberland River, smallscale darter, Tippecanoe darter, and slenderhead darter are reported from the Harpeth River system. Based on presently available information, the two Cumberland-Davidson corridors differ little in the potential to impact listed aquatic animals. The impacts to these species resulting from the selection of any of the four corridors would likely be insignificant. To the extent feasible, the transmission line would be designed to minimize stream crossings and avoid caves and karst areas. Total avoidance of these areas, however, is unlikely, as other constraints, including costs, must also be considered. As described in Chapter 2, stringent erosion and sedimentation control measures, including streambank revegetation, would be implemented during construction and subsequent maintenance activities to minimize impacts to aquatic resources.

4.5.3 Alternative 3 No Action

Under the No Action Alternative, the proposed transmission line would not be constructed and no endangered or threatened plants would be affected.

4.6 Aquatic Ecology

Aquatic life can be impacted either directly by alteration of conditions in the streambed or the riparian zone, or indirectly by runoff from construction and maintenance activities along the transmission line corridor entering aquatic habitats. All intermittent and perennial watercourse crossings would be designated, as appropriate, for Level A (Standard Stream Protection), Level B (Protection of Important Permanent Streams), or Level C (Protection of Unique Habits) protection, as outlined in Appendix F and in Muncy (1999). Level B protection restricts the cutting of trees near permanent streams to those meeting National Electric Safety Code and danger tree requirements and allows for the consultation with TVA biologists to minimize the impact of stream crossings. Watercourses considered to only convey surface water during storm events (i.e., wet-weather conveyances or ephemeral streams) that may be affected by the project corridor would be protected by standard best management practices (BMPs) as identified in Muncy (1999). These BMPs are designed to minimize erosion and subsequent sedimentation in streams.

By following the appropriate requirements on identified streams, the design, construction, and maintenance of this transmission line in any of the alternative study areas would not result in significant impacts to aquatic life. All construction and maintenance work, especially near streams, would be conducted following the requirements and recommendations presented in TVA's guidelines for environmental protection during transmission line construction (Muncy 1999). Road access to construction sites would be planned and built to minimize erosion and sedimentation effects. Maintenance activities along streams would be by mechanical cutting or by selective use of EPA-registered herbicides. Permanent and temporary stream crossings would comply with appropriate Federal and state permitting requirements as well as any applicable designations and BMPs. Where herbicides are used, these chemicals would be applied following EPA label restrictions and TVA BMPs.

4.6.1 Alternative 1 - Cumberland-Montgomery Study Area

Transmission line construction and maintenance could impact aquatic life in numerous small streams as well as Lake Barkley and the Red River. Alternative 1, Corridor D would likely result in the least impact to surface waters of any of the other Alternative 1 or 2 corridor routes under consideration. This corridor is a more direct route, with fewer stream crossings which would result in less direct impact to streams and their riparian zones.

Potential impacts resulting from construction in any of the Alternative 1 corridors will be better quantified when proposed routes are selected. Impacts to aquatic life found in any of the proposed corridors would likely be reduced to insignificant levels with implementation of the measures described above.

4.6.2 Alternative 2- Cumberland Davidson Study Area

Under this alternative, transmission line construction and maintenance could impact aquatic life in numerous small streams as well as Lake Barkley, Cheatham Lake, and the Harpeth River. Potential impacts resulting from construction in either of the Alternative 2 corridor routes will be better quantified when proposed routes are selected. Impacts to aquatic life found in any of the proposed corridors would likely be reduced to insignificant levels with implementation of the measures described above.

4.6.3 Alternative 3 No Action

Under this alternative the transmission line would not be built, so no impacts to aquatic life in area streams would occur as a result of transmission line construction or maintenance.

4.7 Wetlands

Potential wetland impacts resulting from transmission line construction include the conversion and fragmentation of forested wetlands, erosion and sedimentation in wetlands, soil compaction, hydrologic alteration, and reduction of certain functions such as providing wildlife habitat. For the proposed Cumberland-Montgomery or Cumberland-Davidson transmission line construction, the majority of these potential impacts would be avoided or minimized through wetland avoidance and implementation of Best Management Practices (Muncy 1999) as well as measures listed in Appendices B and C.

In all of the potential corridor routes on both the Cumberland-Montgomery and the Cumberland-Davidson alternatives, the majority of the larger wetlands areas (>10 acres)

are concentrated in the river floodplains (especially the Cumberland River) and in tributary stream coves on the Cumberland River. Individual wetlands of various sizes occur in scattered locations in the floodplains of rivers and of second-order and third-order streams, and as relatively narrow, linear landscape features in stream riparian zones. Apart from specific floodplain areas in certain corridors discussed below, the wetlands are generally scattered across the landscape and thus potentially avoidable when planning the actual transmission line routes.

No significant impacts are expected as a result of transmission line crossings of scrub-shrub or emergent wetlands or those wetlands that are within the banks of streams because structure placement in these wetlands would be avoided and there would be at least a 50-foot stream buffer zone. Clearing through the middle of forested wetland tracts would be avoided, to the extent possible, in order to limit forest fragmentation and the permanent conversion of forested wetlands to other types of wetlands (emergent and scrub-shrub. Unavoidable clearing of forested wetlands would require mitigation if the acreage cleared is important within the context of the watershed (generally the cumulative total must be greater than an acre) or the placement of the clearing would result in forested wetland fragmentation that would be ecologically influential within the context of the watershed.

A comparison of the corridor routes in the Cumberland-Montgomery and Cumberland-Davidson alternative study areas in regard to the potential for the avoidance and minimization of wetland impacts is presented below by alternative and corridor. This analysis of impacts is based on NWI data, and may not be accurate because of the limitations of the NWI wetland identification methodology and possible changes in land use since the NWI was completed. The analysis will be confirmed through field surveys once transmission line routes are known.

4.7.1 Alternative 1 - Cumberland-Montgomery Study Area

Corridor D appears to have the highest potential for significant wetland impacts because the size and position of the wetlands within the corridor may make avoidance more difficult than in Corridor A, B, or C. Except for the Shelton's Ferry and Mark's Slough wetlands in shared Corridor AB, corridors A, B, and C appear to be approximately equal in their potential for wetland impact and it appears possible to avoid significant wetland impacts through avoidance and minimization. However, crossing of the Shelton's Ferry Wetlands and Mark's Slough in shared Corridor AB could result in significant wetland impacts if avoidance and minimization of impacts is not possible. Corridor C appears to present the highest potential for wetland avoidance and the lowest potential for significant wetland impacts. Following is a description of potential impacts by corridor.

4.7.1.1 Corridor A

East of the Montgomery Substation, the section shared by Corridors ABCD, has large areas of forested wetland. It is unlikely that these areas would be affected since any transmission line route from the Montgomery Substation to Cumberland Fossil Plant would be in a westerly direction. The wetlands west of the substation in the shared corridor appear to be avoidable because of their relatively smaller size and scattered locations.

In the portion of joint Corridor ABCD near Cumberland Fossil Plant, the NWI data indicates large wetlands associated with Cumberland River tributaries. Because they cover only a small portion of the overall corridor, it appears possible to avoid these wetland areas.

In the western section of shared Corridor AB, Corridor ABC, and in most of corridor A, avoidance or minimization of potential wetland impacts is possible because the wetlands occur primarily in narrow riparian zones and in scattered locations in larger floodplains. The floodplain wetlands could be avoided. Wetland impacts in the narrow riparian zones areas are likely to be minimal and insignificant if none of the following wetland sensitivity criteria apply:

- The wetland is forested;
- The wetland supports uncommon plant communities or rare plant or animal species;
- The wetland is associated with a spring, seep, or sinkhole connected to the groundwater system;
- The wetland is greater than an acre in size and is ecologically connected to other natural habitats.

In the eastern section of shared Corridor AB, there is a potential for wetland impacts in the Cumberland River floodplain where there are large wetland areas in the Shelton Ferry Wetlands and Mark's Slough. Avoidance and minimization of wetland impacts in the Cumberland River floodplain may be possible with careful planning of the transmission line route to avoid all wetlands, or if complete avoidance is not possible, to avoid forested wetlands and to minimize impacts by crossing only emergent or shrub-dominated wetlands. However, impacts could be significant if the area of wetland disturbance cannot be minimized or if forested wetlands would be cleared. Impacts to forested wetlands would result from their being converted to, and maintained as, scrub-shrub and emergent wetlands. If left unmitigated, impacts to forested wetlands would be significant for the following reasons:

- Forested wetlands have experienced the greatest decline of any single category of wetlands, both in the Southeastern USA (Hefner et al 1994), and the USA as a whole (USFWS 2001).
- Forested wetlands are one of the most difficult categories to restore or replace functionally. Creating or regenerating mature forested wetlands and their associated functions may require over eighty years.

Corridor A wetland impacts resulting from transmission line construction are expected to be insignificant if forested wetlands, large wetland areas, and other sensitive wetlands are avoided or the impacts are minimized or mitigated.

4.7.1.2 Corridor B

Section 4.7.1.1 discusses the avoidance and minimization of impacts in the shared sections of Corridor ABCD, AB, and ABC.

A section of Corridor B also is shared with Corridor C. In the both Corridor B and BC, avoidance and minimization of wetland impacts is possible because the wetlands appear to occur primarily in relatively narrow riparian zones. Impacts to these wetlands are likely to

be minimal and insignificant if the wetland sensitivity criteria listed in Section 4.7.1.1 are implemented.

A section of Corridor B is shared with Corridor A. Section 4.7.1.1 discusses the potential impacts and avoidance and minimization of impacts in the shared sections of Corridor AB.

Corridor B wetland impacts resulting from transmission line construction are expected to be insignificant if forested wetlands, large wetland areas, and other significant wetlands are avoided or impacts are minimized or mitigated.

4.7.1.3 Corridor C

Section 4.7.1.1 discusses the avoidance and minimization of impacts in the shared section of Corridor ABCD. Section 4.7.1.2 discusses shared section Corridor BC.

The largest areas of potential wetlands in Corridor C are forested wetlands in the floodplains of the Cumberland River and a Red River tributary. Wetland impacts can be avoided or minimized by avoiding the Cumberland River floodplain, or, if this is not possible, by avoiding forested wetlands in the floodplain. There are potentially forested wetlands along two unnamed tributary streams that may not be possible to completely avoid because they appear to bisect over half of the corridor. Impacts can be minimized by crossing at the narrowest point or near the wetland edge. Other potential wetlands in Corridor C are located in relatively narrow, riparian areas. Wetland impacts in these riparian areas are likely to be minimal and insignificant if the wetland sensitivity criteria listed in Section 4.7.1.1 are implemented

Corridor C wetland impacts resulting from transmission line construction are expected to be insignificant if forested wetlands, large wetland areas, and other sensitive wetlands are avoided or the impacts are minimized or mitigated.

4.7.1.4 Corridor D

Section 4.7.1.1 discusses the avoidance and minimization of impacts in the shared section of Corridor ABCD.

The largest areas of potential wetlands in Corridor D are large forested wetlands and wetland complexes in the floodplains and embayments of the Cumberland River, Spring Creek and tributaries, Fletchers Fork, and Little Fork. Wetlands may be avoidable in some of the floodplain areas by routing of the line to avoid multiple crossings of Spring Creek and other floodplain wetland areas.

Other potential wetlands in Corridor D are located in relatively narrow riparian areas. Wetland impacts in these riparian areas are likely to be minimal and insignificant if the wetland sensitivity criteria listed in section 4.7.1.1 are implemented.

Corridor D wetland impacts resulting from transmission line construction are expected to be insignificant if forested wetlands, large wetland areas, and other sensitive wetlands are avoided or the impacts are minimized or mitigated.

4.7.2 Alternative 2- Cumberland Davidson Study Area

The potential for wetland impacts in Corridors A and B appears approximately equal. In these corridors, it appears possible to avoid significant wetland impacts through avoidance and minimization. The following sections describe potential wetland impacts by corridor.

4.7.2.1 Corridor A

Corridor A contains a combination of relatively narrow forested wetlands in riparian zones and large (up to 20 acres) forested wetlands in the floodplains of streams that drain to the Cumberland River and to the Harpeth River. Potential significant wetland impacts may be avoided by routing the transmission line to avoid the large floodplain wetland areas. Wetland impacts in the narrow riparian area wetlands are likely to be minimal and insignificant if the wetland sensitivity criteria stated in Section 4.7.1.1 are implemented.

Corridor A wetland impacts resulting from transmission line construction are expected to be insignificant if forested wetlands, large wetland areas, and other sensitive wetlands are avoided or the impacts minimized or mitigated.

4.7.2.2 Corridor B

Corridor B is similar to Corridor A in its combination of narrow, riparian zone wetlands and larger forested floodplain wetlands in the Cumberland River and Harpeth River drainages. As in Corridor A, avoidance and minimization of impacts can be achieved through routing the transmission line away from the larger floodplain wetlands and by minimizing impacts to riparian wetlands.

Corridor B wetland impacts resulting from transmission line construction are expected to be insignificant if forested wetlands, large wetland areas, and other sensitive wetlands are avoided or the impacts minimized or mitigated.

4.7.3 Alternative 3 No Action

Under the No Action Alternative, the proposed transmission line would not be constructed. Therefore, no wetlands would be affected.

4.8 Floodplains

Neither the Cumberland Fossil Plant switchyard, the Montgomery 500-kV Substation, nor the Davidson 500-kV Substation are in floodplains. Therefore, the construction activities that would occur in these areas under either Alternative 1 or Alternative 2 would not impact floodplains.

All of the alternative transmission line corridors cross several floodplain areas. Consistent with Executive Order 11988, an overhead transmission line and the support structures are considered to be a repetitive action in the 100-year floodplain. The construction of the support structures for the power line would not be expected to result in any increase in flood hazard either as a result of increased flood elevations or changes in flow carrying capacity of the streams being crossed. To minimize adverse impacts on natural and beneficial floodplain values, the right-of-ways would be revegetated where natural vegetation is removed. Best management practices would be used during construction

activities. Impacts to floodplains under either Alternative 1 or Alternative 2 would be insignificant.

Under the No Action alternative, no impacts to floodplains would occur.

4.9 Managed Areas

4.9.1 Alternative 1 - Cumberland-Montgomery Study Area

All of the Alternative 1 corridors cross the Lake Barkley Reservation and the Wells Creek Cryptoexplosive PNNL. Impacts to the PNNL are likely to be insignificant because of its geologic nature, size, and previous level of disturbance. Impacts to Lake Barkley Reservation would likely be insignificant, and TVA would work with USACE to minimize impacts to this area. The small portion of Cross Creeks NWR in Alternative 1 corridors can likely be avoided.

Corridor A and B each contain two areas noted for their wetland resources, the Shelton Ferry Wetland and Mark's Slough. Long Pond Slough, another important wetland area, is located within Corridor C. If these cannot be avoided during the transmission line routing process, TVA will work with the area managers to minimize/mitigate potential impacts.

The selection of Corridor C would have the potential to impact Wooten's Bluff and the Austin Peay EEC, and the selection of Corridor D would have the potential to impact Fort Campbell Military Reservation. Potential impacts to the small Wooten's Bluff area could be significant. The impacts to the other two areas, portions of which are maintained in early successional habitats, would be dependent on the exact line location.

Corridor D contains three areas that could be significantly impacted by transmission line construction and operation. These sites, two caves and Barnett Woods Designated State Natural Area, support populations of endangered species. They are relatively small and could potentially be avoided during the transmission line routing process.

Corridors A, B and C each contain two streams on the National Rivers Inventory list and Corridor D contains one such stream. Under Alternative 1, the proposed transmission line would cross at least one listed stream regardless of the corridor, and Corridor C would require two such stream crossings. Best Management Practices, including sufficient buffer zones, would reduce impacts to these streams.

In summary, all of the corridors under Alternative 1 have the potential to impact to managed areas and/or ecologically significant sites. Corridor D, with seven such areas, including fragile communities, and a stream listed on the National Rivers Inventory, would likely suffer the most impacts to its sensitive resources. Corridors A and B have the least number of areas that could be impacted, and significant impacts to several of those areas could be minimized through use of Best Management Practices, appropriate revegetation methods and other protective measures.

4.9.2 Alternative 2 - Cumberland-Davidson Study Area

Both Alternative 2 corridors, as mapped in Figure 2-3, include portions of the Lake Barkley Reservation and Cross Creeks NWR. Any transmission line built in either of these corridors would exit Cumberland Fossil Plant to the west and south and not directly impact either of these areas.

Under Alternative 2, crossing both the Wells Creek Cryptoexplosive PNNL and the Harpeth State Scenic River would be unavoidable in either Corridor A or B. Impacts to the PNNL are likely to be insignificant because of its geologic nature, size, and previous level of disturbance. TVA would work with the Tennessee Division of Natural Heritage to minimize impacts from any unavoidable crossings of the Harpeth River, a designated State Scenic River. Potential measures could include maintenance and restoration of low-growing trees and shrubs on streambanks and placement of structures to minimize their visibility from the river.

Corridor A would pass through the Cheatham Wildlife Management Area; the significance of impacts to the WMA would depend on the line's location in the WMA and compatibility of ROW management with the area's management objectives. In addition to crossing the Harpeth State Scenic River twice, Corridor A would also Jones Creek, which, like the Harpeth River, is listed on the National Rivers Inventory. The selection of Corridor B would result in crossing Jones Creek, Big Turnbull Creek, and the South Harpeth River, in addition to the Harpeth River; all of these streams are listed on the National Rivers Inventory.

Potential impacts to Hava-Lakatu and Svenson's Bluff Protection Planning Site, both in Corridor B, depend on the location of the actual transmission line routes. Each of these areas is small and potentially avoidable.

Although both corridors hold the potential for impacts to managed areas and/or ecologically sensitive sites, this potential is higher for Corridor A than for Corridor B because of the presence of Cheatham WMA at least two crossings of the Harpeth State Scenic River in Corridor A.

4.9.3 Alternative 3 No Action

Under the No Action Alternative, the proposed 500-kV transmission line would not be built. Therefore, no impacts to managed areas, ecologically significant sites or streams listed on the National Rivers Inventory are anticipated.

4.10 Recreation

4.10.1 Alternative 1 - Cumberland-Montgomery Study Area

Recreation activities in the immediate vicinity of the proposed transmission line would be temporarily disrupted during line construction. This would likely only last a few weeks on any particular line segment, and is not expected to cause significant impacts. Little long-term impact to dispersed recreational activities, such as hunting and fishing, is anticipated as these activities are generally a compatible use of transmission line ROWs.

TVA will attempt to avoid developed recreation facilities during the transmission line routing process. In the event that areas such as local parks cannot be avoided, TVA will minimize impacts through careful siting of transmission structures, and by working with the area managers to restore and landscape the recreation areas. All of the Alternative 1 corridors cross the Cumberland River/upper Lake Barkley, and this river crossing would likely have little impact on river-based recreation. The area of parks and other developed recreation areas is somewhat greater in Corridors B and D than in A and C, making these corridors

somewhat less desirable from a recreation perspective. Overall impacts to recreation from a transmission line in any of the Alternative 1 corridors are expected to be insignificant.

4.10.2 Alternative 2- Cumberland Davidson Study Area

Potential impacts to dispersed recreation activities and to developed recreation facilities are similar to those described above for Alternative 1. The area of parks and other developed recreation areas is somewhat greater in Corridor B than in Corridor A. The selection of Corridor B would also result in at least one more crossing of the Harpeth State Scenic River, portions of which receive heavy recreational use, than would selection of Corridor A. For these reasons, Corridor B is somewhat less desirable from a recreation perspective than Corridor A. Compared to Alternative 1, the potential impacts to recreation from selection of Alternative 2 would likely be somewhat greater, although still likely insignificant.

4.10.3 Alternative 3 No Action

Under the No Action alternative the transmission line would not be built. Therefore, no impacts to recreation would result.

4.11 Prime Farmland

4.11.1 Alternatives 1 and 2- Cumberland-Montgomery and Cumberland Davidson Study Areas

No prime farmland would be affected by the activities proposed at the Cumberland Fossil Plant, the Montgomery 500-kV Substation, or the Davidson 500-kV Substation because by definition these locations contain no prime farmland. The proposed transmission line, regardless of the alternative and corridor, would require the construction of transmission structures in prime farmland. The area disturbed by structure construction would be small, and permanent disturbances would be limited to the structure foundations. The total area removed from farm production would be small and is not likely to significantly impact prime farmland. A more detailed evaluation of potential prime farmland impacts will be conducted once actual transmission line routes are delineated. This evaluation, following standard National Resources Conservation Service procedures, will be based on the acreage of prime, unique, and important farmland in the project area, the total area in the project corridor, and the area that would be converted to non-farm uses. It is not likely to result in a determination of adverse effects to prime farmland.

4.11.2 Alternative 3 No Action

Under the No Action alternative, no impacts to prime farmland would occur.

4.12 Visual Resources

Visual consequences are examined in terms of visual changes between the existing landscape and the landscape as altered by the proposed actions, sensitivity of viewing points available to the general public, their viewing distances, and visibility of proposed changes. In this assessment, scenic character is described using the following terms: variety, unity, coherence, harmony, tranquility, and uniqueness. Scenic integrity, which relates to degree of intactness or wholeness of the landscape character, is also an important factor. These measures help identify changes in visual character based on commonly held perceptions of landscape beauty and the aesthetic sense of place. The

foreground, middleground, and background viewing distances were previously described in Section 3.10.

4.12.1 Alternative 1 - Cumberland-Montgomery Study Area

4.12.1.1 Corridor A

The predominately industrial visual character of the area around and adjacent to the Cumberland Fossil Plant would not be severely altered as a result of the construction or operation of a new 500-kV transmission line. There may be some temporary visual discord in the immediate plant site area due to an increase in personnel, equipment, new laydown area, and other associated activities. However, this would be temporary until construction activities and site restoration is complete.

The corridor section between the plant site and the Cumberland River to the east is characterized by scattered residential development and few motorists along local thoroughfares. Views of the new line would predominately be in the middleground (one mile to four miles) for these area residents. The new laced-steel structures may provide some visual contrast with the existing more horizontal man-made alterations (one-to two-story homes, barns, and small silos). This contrast, however, would be insignificant when viewed from these distances.

Turning north, the proposed corridor would pass near and over the Cumberland River. Visual impacts as a result of transmission line development in this area would be greatest for recreational users along the river. New structures in new locations would contribute to reduced visual coherence and harmony. Construction activities, such as right-of-way clearing, structure construction, and providing material stockpiles would temporarily add visual discord and further reduce scenic integrity during the construction period

Impacts to the area from the north bank of the Cumberland River to the Montgomery 500-kV Substation would be similar to those described along the route from the plant site to the Cumberland River. Most views would be in the middleground for motorists and area residents along local thoroughfares. Additional structures near the Montgomery Substation would increase the number of adversely contrasting elements seen in the landscape. These incremental changes, particularly within and near the Montgomery Industrial Park, may not be individually significant, but together would add to existing disruptions of visual coherence and harmony.

4.12.1.2 Corridor B

Corridor B includes the area from just west of the Montgomery County line to the Cumberland Fossil Plant. To the east, the corridor includes the area north of the Cumberland River to the Montgomery 500-kV Substation. Visual impacts as a result of construction and operation in these areas are described in greater detail in Section 4.10.1.1.

The remaining section of a new transmission line in Corridor B would be viewed by motorists along TN 13 and to a lesser extent along TN 48. These views will be mainly between poles and under lines, particularly in the foreground (within ½ mile of the observer). Most views will be brief due to natural topography and vegetative screening. As

distances from main roads increase, terrain will become a factor in reducing vertical profiles of the new structures.

4.12.1.3 Corridor C

Corridor C begins at the Cumberland Fossil Plant and travels northeast across the Cumberland River to the Montgomery 500-kV Substation. A description of visual impacts to the area adjacent to the Cumberland Fossil Plant and the area surrounding the Montgomery Substation is described in Section 4.10.1.1.

Visual impacts along this corridor would be most significant near the Cumberland River along McGregor Park and the downtown Clarksville Historical River District. New structures would introduce a vertical element not seen in the landscape now, contrasting with the broad expanse of river seen by recreation users on the water and along walking trails in the foreground and middleground.

Additional visual impacts will occur for property owners and motorists along minor roads along each side of the Cumberland River south of McGregor Park, mostly in the foreground. Depending upon the exact location of the transmission line, scenic views could be irreversibly altered by introducing new vertical structures and broadly horizontal expanses of transmission lines.

4.12.1.4 Corridor D

Corridor D begins at the Cumberland Fossil Plant and travels northeast to the Montgomery 500-kV Substation. A description of the visual impacts to the area adjacent to the Cumberland Fossil Plant and the area surrounding the Montgomery Substation is described in Section 4.10.1.1.

Impacts along this corridor section would be visually insignificant. Along the southern section of the corridor, the proposed transmission line would be seen by scattered residents in the middleground and motorists in the foreground along local roads. Closer to the Montgomery Substation, the new transmission line would be visually similar to existing laced-steel towers and wood-pole structures. Additional structures and new locations, however, would increase the number of adversely contrasting elements seen in the landscape. These incremental changes may not be individually significant, but together would add to existing disruptions to visual coherence and harmony.

4.12.2 Alternative 2- Cumberland Davidson Study Area

4.12.2.1 Corridor A

Corridor A begins at the Cumberland Fossil Plant and travels southeast to the Davidson Substation. A description of the visual impacts to the area adjacent to the Cumberland Fossil Plant is described in Section 4.10.1.1.

Most views of the proposed transmission line route would be seen by motorists along any of the numerous state routes that bisect the corridor. Visual consequences as a result of construction or operation of a new transmission line in these areas will be insignificant. The new route will be visually similar to existing lines and various towers seen along ridge lines from major roads and local residences.

The area surrounding the Davidson Substation is a scenic valley, particularly when viewed from TN 100 to the east. However, there are numerous homes with foreground views of the substation, and many new subdivisions under construction in the immediate area. A new transmission line entering the substation from the west along Corridor A would have insignificant visual contrast to the vertical elements seen in the landscape surrounding the substation.

4.12.2.2 Corridor B

Corridor B begins at the Cumberland Fossil Plant and travels southeast to the Davidson 500-kV Substation. A description of visual impacts to the area adjacent to the Cumberland Fossil Plant is described in Section 4.10.1.1. A description of impacted areas adjacent to the Davidson Substation is described in Section 4.10.2.1.

There will be no significant visual impacts as a result of the new line route along the remainder of Corridor B from Davidson Substation north to the Harpeth River. There are few thoroughfares and residences along this corridor. Closer to the Harpeth River, new laced-steel towers and lines would be visually comparable to those seen in the area now along major residential and commercial developments.

4.12.3 Alternative 3 – No Action

There would be no visual consequences if the proposed transmission line is not built.

4.13 Cultural Resources

4.13.1 Alternative 1 - Cumberland-Montgomery Study Area

The corridor with the fewest previously identified historic properties is Corridor D. Any corridors chosen under this alternative will undergo a Phase I historic properties survey once the line locations are known. This survey will be designed to identify and evaluate all historic properties, including historic sites, historic structures, and archaeological sites, that may be within the line's APE. Previously identified historic properties that are categorized as not eligible, potentially eligible, eligible or undetermined will be re-evaluated to determine if changes over time have affected their NRHP eligibility. For properties that are listed or determined eligible, the criteria of adverse effect will be applied in consultation with the SHPO and other consulting parties to determine if the project will adversely affect the characteristics for which the property is NRHP eligible. Adverse effects to NRHP eligible or listed properties would have to be avoided, minimized or mitigated.

4.13.2 Alternative 2- Cumberland Davidson Study Area

The corridor with the fewest previously identified historic properties is Corridor A. As described above for Alternative 1, any corridors chosen under this alternative will undergo a Phase I historic properties survey once the line locations are known to identify and evaluate all historic properties that may be within the line's APE. Previously identified historic properties that are categorized as not eligible, potentially eligible, eligible or undetermined will be re-evaluated to determine if changes over time have affected their NRHP eligibility. For properties that are listed or determined eligible, the criteria of adverse effect will be applied in consultation with the SHPO and other consulting parties to determine if the project will adversely affect the characteristics for which the property is NRHP eligible.

Adverse effects to NRHP eligible or listed properties would have to be avoided, minimized or mitigated.

4.13.3 Alternative 3 No Action

No historic properties would be affected.

4.14 Socioeconomics

4.14.1 Alternatives 1 and 2- Cumberland-Montgomery and Cumberland Davidson Study Areas

Potential socioeconomic effects from the construction and operation of the proposed transmission line include changes in population, employment, housing, retail sales, property tax, and property values. These effects would, in general, be relatively similar in the two alternative study areas; a more detailed evaluation cannot be completed until actual line routes are known. Based on a coarse scale analysis, potential environmental justice impacts – disproportionate impacts on low income and minority populations – are not expected to occur. They will be evaluated at a finer scale once final transmission line routes are known.

The proposed action would not encourage population growth in the project area; it would instead be a response to growth already occurring and projected to occur in Middle Tennessee. Construction of the proposed transmission line would involve a crew of about 75 people for a 21-month period. Because it requires specialized labor, construction crews would likely be brought in from outside the project area and leave after construction is complete. Consequently, little change in local employment levels would occur.

Little impact on housing is expected to occur. Most construction workers would likely provide their own lodging using camping or trailers, or use motels. Some local revenues would be generated through lodging or campground rental fees, and through purchases of meals and other items. The impacts of this additional revenue would vary inversely with the size of the community where the purchases occur; it would be negligible in the larger communities such as Clarksville and Nashville and small elsewhere. Many construction materials, including the transmission towers and conductors, would likely be purchased outside the project area. Some other materials, such as concrete, gravel, and culverts could be purchased locally.

Because TVA is a Federal Agency, it is exempt from local property taxes. TVA does, however, make in lieu of tax payments. These payments are based, in part, on the value of TVA-owned assets in a county. The proposed transmission line would result in small increases of in lieu of tax payments. This increase would be negligible in Stewart County (because of the presence of Cumberland Fossil Plant) and Davidson County (because of the short distance of new line and presence of several other TVA assets), and somewhat larger in the other project area counties.

TVA would purchase easements from property owners, who would be offered fair market value for these rights. Some short-term adverse impacts on property value and salability could occur; these impacts, however, would be highly variable and not readily predictable. Long-term adverse effects on property values are unlikely.

4.14.2 Alternative 3 – No Action

The No Action Alternative would not directly or indirectly affect local population, employment, housing, retail sales, property tax, and property values. The resulting lack of transmission capacity could, over the long term, have other adverse socioeconomic effects to the Middle Tennessee area through the loss of electric service.

4.15 Electric and Magnetic Fields

Transmission lines, like other types of electrical wiring, generate both electric and magnetic fields (EMF). An electric field is generated by the voltage on the conductors of the transmission line, and occupies the space between the conductors and other conducting objects such as the ground, transmission line structures, or vegetation. A magnetic field is generated by the current (movement of electrons) in the conductors, and the strength of the field depends on the current, design of the line, and distance from the line.

Magnetic fields can induce currents in conducting objects. Electric fields can create static charges in ungrounded, conducting materials. The strength of the induced current or charge under a transmission line varies with the strength of the electric or magnetic field, and with the size and shape of the conducting object, and with whether the conducting object is grounded. Induced currents and charges can cause shocks under certain conditions when a person contacts objects in an electric or magnetic field. The proposed transmission line, like other transmission lines, would be designed to minimize the potential for such shocks. This is done, in part, by maintaining sufficient clearance between the conductors and objects on the ground. Stationary conducting objects, such as metal fences, pipelines, and highway guard rails, which are near enough to the transmission line to develop a charge, would be grounded to prevent them from being a source of shocks.

Under certain weather conditions, high voltage transmission lines, such as the proposed 500-kV line, may produce an audible low-volume hissing or crackling noise. This noise is generated by the corona resulting from the dissipation of energy and heat as high voltage is applied to a small area. Under normal conditions, corona-generated noise is not audible. The noise may be audible under some wet conditions, and the resulting noise level off of the ROW would be well below the levels that can produce interference with speech. Corona is not associated with any adverse health effects in humans or livestock.

Public concern exists over the potential adverse health effects that may be caused by long-term exposure to EMF. A few studies of this topic have raised questions about cancer and reproductive effects on the basis of biological responses observed in cells or in animals, or on associations between surrogate measures of powerline fields and certain types of cancer. This topic has been researched for several decades. The consensus of scientific panels reviewing this research is that the evidence does not support a cause-and-effect relationship between EMF and any adverse health outcomes (e.g., AMA 1994, NRC 1997, NIEHS 2002). Some research continues of the statistical association between magnetic field exposure and a rare form of childhood leukemia known as acute lymphocytic leukemia. A recent review of this topic by the World Health Organization (IARC 2002) concluded that this association is very weak, and there is inadequate evidence to support any other type of excess cancer risk associated with exposure to EMF.

The proposed 500-kV transmission line would at times produce both electric and magnetic fields that are higher than those of TVA's more common 161-kV transmission lines. The greater fields would be measurable both on and beyond the edges of the ROW. TVA's

standard transmission line siting practice minimizes continuous public exposure to transmission line EMF by using a constraint model that places a 300-foot buffer from the edge of the ROW to occupied buildings, except for schools, where a 1200-foot buffer is used. This practice, as well as TVA's policy of prohibiting the construction of occupied buildings within the ROW, would minimize continuous public exposure to EMF. Although no Federal standards exist for maximum EM field strengths for transmission lines, six states (not including Tennessee), do have such standards. The expected EM field strengths at the edge of the proposed ROW would fall well within these standards. Consequently, the construction and operation of the proposed transmission line is not anticipated to cause any significant EMF-related impacts.

4.15.1 Alternative 1 - Cumberland-Montgomery Study Area

Electric and magnetic fields would be produced along the length of the proposed transmission line. The strength of the fields within and near the ROW would vary with the electric load on the line as well as with the terrain. Public exposure to EMF would be determined by final routing decisions, and would change over time after the line is completed as adjacent land uses change. As described above, TVA would minimize public exposure to EMF through engineering features and line routing decisions. No significant impacts from EMF are anticipated.

4.15.2 Alternative 2- Cumberland Davidson Study Area

The potential EMF effects described above for Alternative 1 also apply to Alternative 2.

4.15.3 Alternative 3 No Action

Under the No Action Alternative, no new electric and magnetic fields would be created from the construction of the proposed transmission line. The electrical loading on portions of TVA's existing transmission system would likely be increased, resulting in increases in EMF. This increase, however, would not result in any significant impacts.

4.16 Unavoidable Adverse Effects

The construction and operation of the proposed transmission has the potential to result in unavoidable adverse effects to several resources. These adverse effects could include the loss of forest area and associated wildlife populations; increased forest fragmentation; removal of the tree canopy at stream crossings; removal of existing buildings from the new ROW; restructions on future land use in the ROW; and changes to scenery along the ROW. TVA will attempt to minimize unavoidable adverse effects during project planning and, where feasible, through implementation of mitigation measures.

4.17 Relationship of Short-Term Uses and Long-Term Productivity

The construction and operation of the proposed transmission line would increase the short-term and long-term capacity and reliability of the power supply in TVA's service area. This would help support the economic and population growth that is occurring in the middle Tennessee area.

The proposed action would result in both short-term and long-term effects on vegetation, especially in forested areas where potential forest productivity, including timber and

associated wildlife production, would be lost from within the ROW. A small amount of agricultural productivity would be lost from new transmission structure foundations and access roads. There would be long-term effects on land use within the ROW due to restrictions on building construction, and long-term effects on scenery in the project area due to the visual intrusions of the transmission structures and conductors. These effects would, to the extent possible, be minimized during project planning.

4.18 Irreversible and Irretrievable Commitments of Resources

The materials used for construction of the proposed facilities would be committed for the life of the facilities. Some materials, such as ceramic insulators and concrete foundations, may be irrevocably committed, while the metals used in conductors, supporting structures, and other equipment could be recycled. The useful life of the transmission structures is expected to be at least 60 years.

The rights-of-way used for the transmission line would not be irreversibly committed and could be returned to other uses upon retirement of the line. In the interim, compatible uses of the right-of-way, such as farming and providing early successional wildlife habitat, could continue. Forest products and related late-successional wildlife which might have grown on the presently forested portions of the right-of-way would be lost for the life of the project.

4.19 Preliminary Summary of TVA Commitments and Proposed Mitigation Measures

TVA would minimize many environmental impacts by adhering to the conditions in conditions in Appendices B, C, and D. TVA would also categorize affected streams and apply the corresponding protective measures as described in Appendix E, Best Management Practices, as described in Muncy (1999) would also be used. Additional commitments and measures to mitigate adverse effects will be determined following field investigations of specific transmission line routes, and will be listed in the Final EIS.